



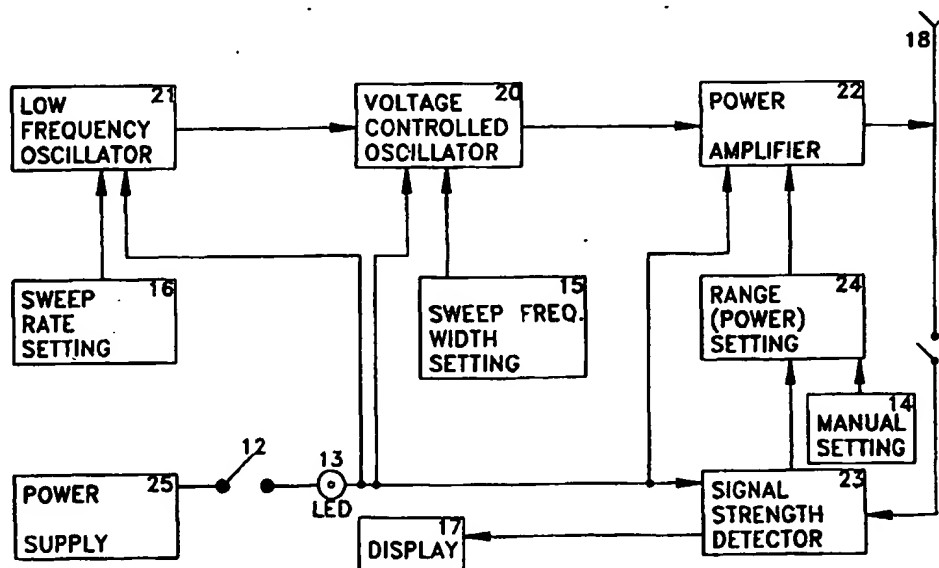
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(54) Title: METHOD AND DEVICE FOR DISABLING CELLULAR PHONES



(57) Abstract

A method of disabling the use of a cellular phone within a confined area in a cell site, comprising transmitting within said confined area a jamming signal continuously varying in frequency to cover the service band for the respective cell site and of a power level to have a range sufficiently only for the respective confined area.

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METHOD AND DEVICE FOR DISABLING CELLULAR PHONES

The present invention relates to a method and also to a device for disabling the use of cellular phones within a predetermined confined area.

5 Cellular phones, which have come into wide spread use, frequently produce disturbances to those in the immediate vicinity. The use of cellular phones can even introduce a hazard, such as when used in the vicinity of electronic instrumentation at airports, hospitals, and the like. Many locations therefore request that cellular phones not be used, or expressly ban their use.

10 Such a ban requires the user to turn-off his/her phone when entering such an area, but users frequently neglect to do this. As a result, cellular phones frequently create undesirable disturbances and even health hazards.

An object of the present invention is to provide a method, and also a device, for disabling the use of cellular phones within specified confined areas

15 without depending on the user to turn-off the cellular phone.

According to one aspect of the present invention, there is provided a method for disabling the use of a cellular phone within a confined area in a cell site, comprising transmitting within the confined area a jamming signal continuously varying in frequency to cover the service band for the respective

20 cell site and of a power level to have a range sufficiently only for the respective confined area.

The service band refers to a specific band of frequencies used by the cellular telephone system to locate a subscriber found in the cell site by sending

its address. The service band can appear as any band in the cellular system. Sometimes on a separate channel and sometimes in a reception channel. It is jointly used by all the cell sites in the network to inform a subscriber which speech channel is to receive the call. The subscriber also uses the service
5 band frequencies to indicate the ready status of the phone to receive a call, and to indicate the power of the signal in the respective cell site.

A number of important advantages are provided by jamming the service frequency bands rather than the complete transmission band. Thus, since the power required for this purpose varies with the band width of the transmitted
10 signal, less power is needed to disable the cellular phones within a pre-determined confined area. This enables the disabling to be better restricted to a specific confined area and without disturbing adjacent areas not intended to be affected. In addition, the disabling will be effected only before a telephone connection has been made in the restricted area, and will not interfere with
15 telephone conversations that have already started to take place before the blocking device has been activated (in most cases). Accordingly, there will be less chance that the device will interfere with transient persons traveling through the restricted area.

20 According to further features in the described preferred embodiment the frequency of the jamming signal is continuously varied in specific frequencies from about 800 MHz to about 980 MHz. This frequency range of the jamming or disabling signal is presently the one used by cellular phone networks but this

could change in the future. In addition, the power level of the jamming signal is from 0.5 to 10 milliwatts, preferably about 1.0 milliwatt. This value could also change in the future.

According to another aspect of the present invention, there is provided a
5 device for disabling the use of a cellular phone within a confined area in a cell site, comprising a small portable housing including a voltage controlled oscillator controlled to vary the frequency of a jamming signal; a low frequency oscillator controlling the voltage controlled oscillator to control the frequency repetition rate of the jamming signal; a power amplifier receiving the output of the voltage
10 controlled oscillator and amplifying the output to said power level of about 0.5 to 10 milliwatts; and an antenna receiving the output of the power amplifier and transmitting the output to the respective confined area.

As will be described more particularly below, the foregoing method and device may be used for automatically disabling cellular phones within a confined
15 area, such as a meeting room, hall, vehicle, airport, hospital, etc., where their use may create undesirable disturbances or even dangerous hazards. The disabling of the cellular phones is effected automatically and does not require any particular act by the carrier of the cellular phone.

Further features and advantages of the present invention will be apparent
20 from the description below.

The invention is herein described by way of example only, with reference to the accompanying drawings, wherein:

Fig. 1 schematically illustrates a cellular phone and a device constructed in accordance with the present invention for disabling the use of such a cellular phone within a confined area; and

Fig. 2 is a block diagram illustrating the electrical circuitry in one form of
5 disabling device constructed in accordance with the present invention.

The cellular phone 2 illustrated in Fig. 1 is of a commonly-used type. It includes a small portable housing 3 having an ear piece 4 disposed in the upper end of the housing, a mouthpiece 5 pivotally mounted to the lower end of the housing, a keyboard 6 containing depressable number and control
10 keys, a display 7, and an antenna 8. At the present time, such cellular phones generally operate in the frequency band of 800-960 MHz, but future networks will probably work at higher frequencies, in the GHz spectrum. The broadcast band and the receiver band constitute most of the 800-960 MHz band width, with the service band being about 870-960 MHz. For example, one system
15 operates at 870-890 MHz, and another at 920-960 MHz. Such cellular telephones generally transmit at power levels of about 600-700 milliwatts.

Since such cellular phones are well known, further details of their construction and operation are not set forth herein.

In accordance with the present invention, a device, generally designated
20 10 in Fig. 1, is provided for disabling the use of a cellular phone within a confined area, such as a room, hall, vehicle or the like. For this purpose, the portable disabling device 10 is physically placed in the confined area to be neutralized. It continuously transmits a jamming signal continuously varying in

frequency to cover the service band spectrum for the respective cellular sites, and of a power level to have a range sufficiently only for covering the respective confined area.

In the embodiment described herein, the frequency of the jamming signal is continuously varied in specific frequencies from about 800 to 980 MHz so as to cover the service band or the respective cell site. By thus covering the complete service band all the cellular phones within that confined area will be disabled since they will not have a service band available to them, and therefore will display a no service available message in display 7.

In the embodiment of the invention described below, the power level of the jamming signal is preferably about 0.5 to 10 milliwatts. This is usually sufficient to jam the confined area but not to disturb the use of cellular telephones outside the confined area. Preferably the power level of the jamming or disabling signal is about 1.0 milliwatts. This power level which is two or three orders of magnitude below the 600-700 milliwatts transmitted by the cellular telephones, would normally not require FCC approval nor is it likely to produce hazards to instrumentations or controls that might be caused by the 600-700 milliwatt power level transmitted by cellular telephones.

The disabling device 10 illustrated in Fig. 1 includes a housing 11 which encloses the electrical circuitry described below illustrated in Fig. 2. The illustrated device includes an on/off switch 12, an LED indicator 13 indicating when the unit is operating, a manual range setting control 14 for setting the range of the device, a sweep frequency control 15 permitting manual setting of

the lower frequency and the upper frequency of the jamming signal, and a manual control 16 for presetting the sweep frequency repetition rate of the jamming signal.

Unit 10 illustrated in Fig. 1 further includes a display 17 for displaying the
5 signal strength of the cellular telephone system signal received in the respective area of the cell site. The power level of such a signal depends on the location of the confined area to be neutralized, and also the prevailing weather conditions. It determines the range setting 14, which setting controls the power of the jamming signal to assure that it is sufficient for disabling only the cellular
10 phones in the respective confined area where the unit 10 is located.

As shown in Fig. 2, the electronic circuitry within housing 11 of the disabling unit 10 includes a voltage controlled oscillator 20 which generates the jamming signal at a frequency controlled by a low frequency oscillator 21, and a power amplifier 22 which amplifies the jamming signal and transmits it into the
15 confined area via antenna 18. The frequency of the jamming signal generated by the voltage controlled oscillator 20 is preset by the manual frequency setting 15, and the sweep frequency repetition rate is controlled by the low frequency oscillator 21 as preset by the sweep rate setting 16. The output power or range of the transmitter jamming signal may be preset by manual control 14;
20 alternatively, it may be automatically controlled by the signal strength detector 23 which detects and measures the signal strength of the cellular telephone system at the respective confined area, displays it in display 17, and automatically controls the power amplifier 22 via the range setting circuit 24.

Since the signal strength detector 23 cannot operate at the same time that the disabling unit 10 transmits the jamming signal, detector 23 may be in the form of a separate unit providing a reading of the detected signal strength, enabling the user to manually preset the power setting (24) of the disabling unit.

5 Disabling unit 10 is preferably in the form of a small, portable, self-contained unit. Accordingly, it includes its own battery power supply 25 for supplying the power to the above-described circuit components via the on/off switch 12 and the LED indicator 13.

It will be appreciated that the various controls illustrated in the unit of Fig. 1 are
10 shown for purposes of example only, and that some of these controls could be pre-set at the factory, could be omitted, and/or other controls could be included. Also, the disabling unit can be built in the form of a synthesized oscillator in which the frequencies are controlled by a crystal in a phased lock loop (PLL) system to prevent problems in manual adjustment of the frequency or in its
15 stabilization with respect to time, temperature, different voltages, different antenna loads, etc. Also, the system could use a programmable attenuator to control the range instead of a programmed amplifier.

Therefore, while the invention has been described with respect to one preferred embodiment, it will be appreciated that this is set forth merely for
20 purposes of example, and that many other variations, modifications and applications of the invention may be made.

What is claimed is:

1. A method of disabling the use of a cellular phone within a confined area in a cell site, comprising:
5 transmitting within said confined area a jamming signal continuously varying in frequency to cover the service band for the respective cell site and of a power level to have a range sufficiently only for the respective confined area.
2. The method according to Claim 1, wherein the frequency of said
10 jamming signal is continuously varied in specific frequencies from about 800 MHz to about 980 MHz.
3. The method according to either of Claims 1 or 2, wherein the power level of the jamming signal is from 0.5 to 10 milliwatts.
4. The method according to Claim 3, wherein the power level of the
15 jamming signal is about 1.0 milliwatts.
5. The method according to any one of Claims 1-4, wherein the cellular phone system signal level at the respective confined area is first measured, and that measurement is used to preset the power level of transmission of the jamming signal so that its range is sufficiently only for the
20 respective confined area.
6. The method according to Claim 5, wherein said measured signal level is displayed to enable the user to preset said power level.

7. The method according to Claim 5, wherein said measured signal level is used to automatically preset said power level.

8. The method according to any one of Claims 1-7, wherein said confined area is a room.

5 9. The method according to any one of Claims 1-7, wherein said confined area is a hall.

10. The method according to any one of Claims 1-7, wherein said confined area is a vehicle.

10 11. The method according to any one of Claims 1-10, wherein said jamming signal is transmitted by a small portable unit placed in said confined area.

12. The method according to Claim 11, wherein said small portable unit includes:

15 a voltage controlled oscillator controlled to sweep the frequency of the jamming signal;

a low frequency oscillator controlling the voltage controlled oscillator to control the sweep frequency repetition rate of the jamming signal;

a power amplifier receiving the output of the voltage controlled oscillator for amplifying the output to said power level of the jamming signal;

20 and an antenna receiving the output of the power amplifier and transmitting said output to the respective confined area.

13. The method according to Claim 12, wherein said antenna is an omnidirectional antenna and is placed in the middle of the confined area.

14. The method according to Claim 12, wherein said antenna is a directional antenna and is placed at one end of the confined area.

15. A device for disabling the use of a cellular phone within a confined area in a cell site, comprising:

5 a small portable housing including:

a voltage controlled oscillator controlled to vary the frequency of a jamming signal;

a low frequency oscillator controlling the voltage controlled oscillator to control the sweep repetition rate of the jamming signal;

10 a power amplifier receiving the output of the voltage controlled oscillator and amplifying the output to a power level of about 0.5 to 10 milliwatts;

and an antenna receiving the output of the power amplifier and transmitting said output to the respective confined area.

15

16. The device according to Claim 15, wherein said voltage controlled oscillator is continuously varied to sweep specific frequencies from about 800 MHz to about 980 MHz.

17. The device according to either of Claims 15 or 16, wherein the
20 power level of the jamming signal is about 1.0 milliwatts.

18. The device according to any one of Claims 15-17, wherein said power amplifier includes a control for pre-setting the power level of the jamming signal.

19. The device according to Claim 18, wherein said control includes a presettable manual control.

20. The device according to either of Claims 18 or 19, wherein said control includes a detector for detecting and measuring the signal level received
5 at the respective cell site, and a control circuit for automatically controlling said power amplifier in accordance with said measured signal level.

21. The device according to any one of Claims 15-20, wherein said voltage controlled oscillator includes a manual control for pre-setting the sweep frequency of the jamming signal.

10 22. The device according to any one of Claims 15-21, wherein said low frequency oscillator includes a manual control for pre-setting the sweep repetition rate of the jamming signal.

23. The device according to any one of Claims 15-22, wherein said antenna is an omnidirectional antenna.

15 24. The device according to any one of Claims 15-22, wherein said antenna is a directional antenna.

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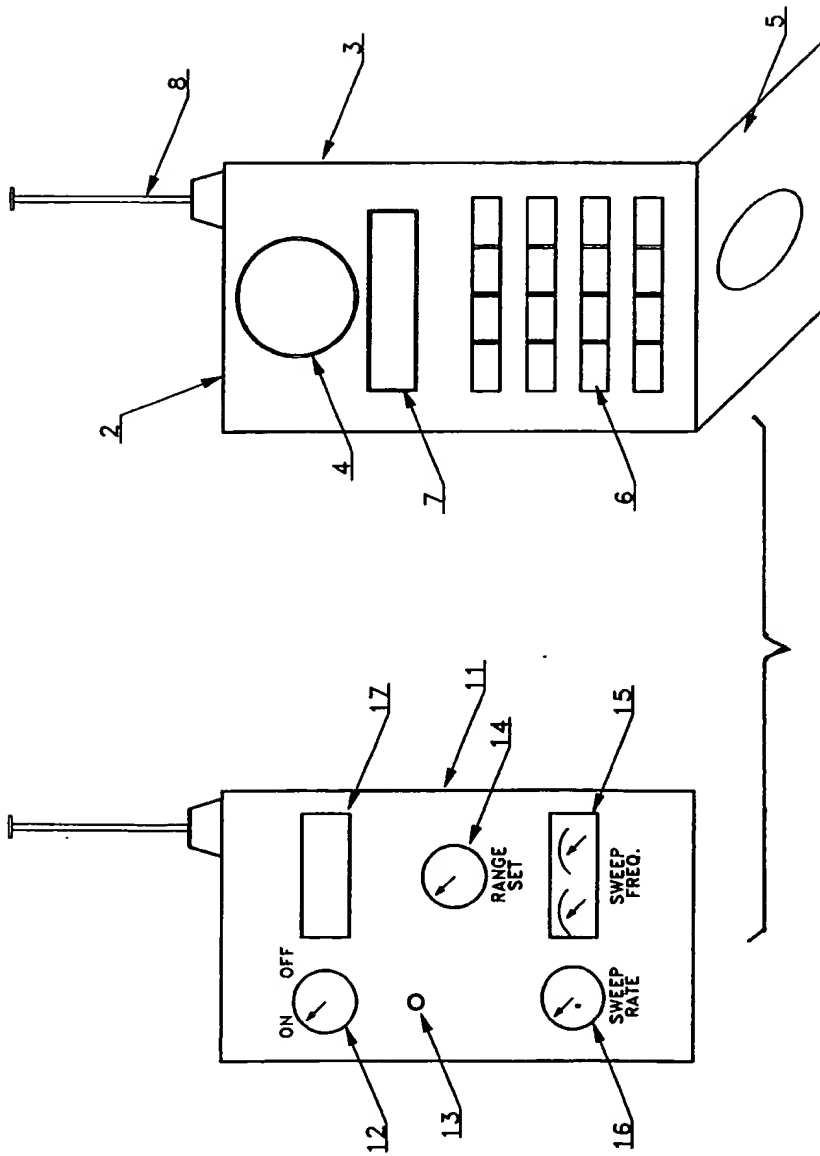


FIG. 1

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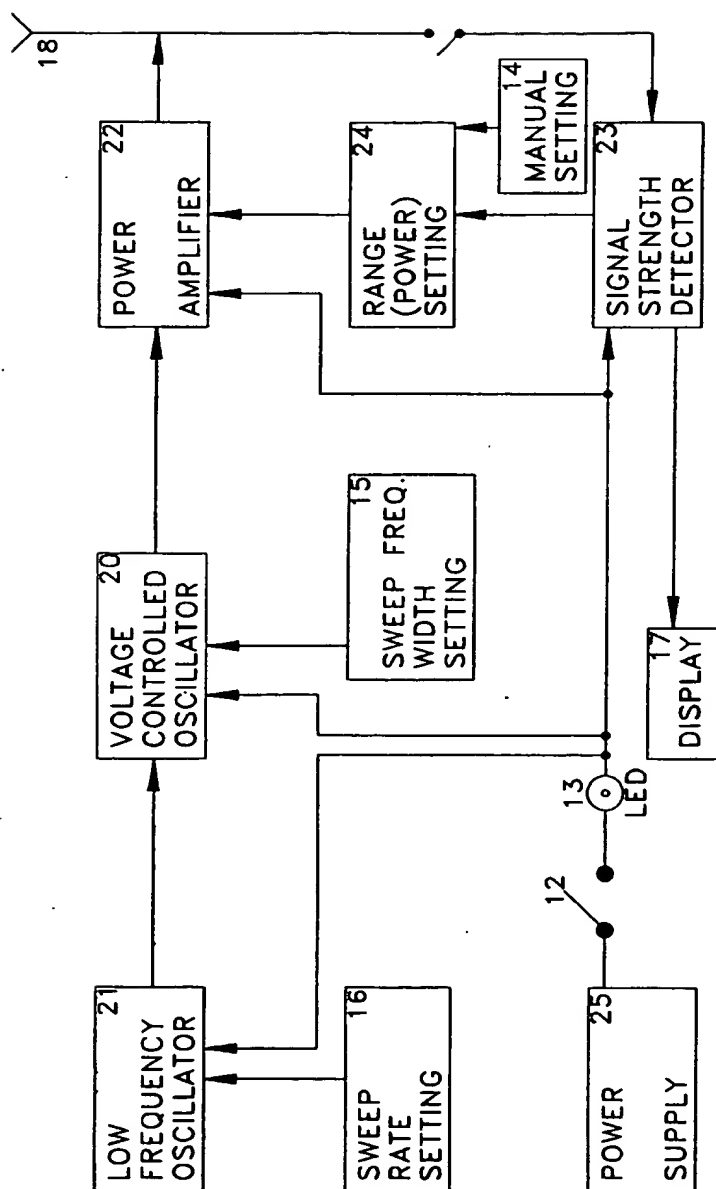


FIG. 2

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